ASSESSMENT DIRECTIVE
FOR THE
KOMO® PRODUCT CERTIFICATE
FOR
TIMBER PRESERVATION

Authorized by the Committee of Experts of SKH on 30-110-2012
Accepted by the Building Harmonization Committee of the Foundation for Building Quality on 21-08-2013

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GENERAL INFORMATION CONCERNING THIS PUBLICATION

This Assessment Directive was declared binding on the 21-08-2013 by the certification body SKH, in accordance with the SKH Regulations for Certification, and shall, as from 21-08-2013 be used for the issuing of a KOMO® product certificate for “Timber preservation”.

This completely revised Assessment Directive replaces BRL 0601 “Timber preservation” dated 28-04-2010

The Dutch version shall be consulted in case of doubt

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<th>Type of preservation</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

### BIJLAGE 4a:

Model KOMO® product certificate Timber preservation
1. INTRODUCTION

1.1 General

The requirements laid down in this Assessment Directive are used by the certification and attestation bodies, accredited by the Council of Accreditation during the handling of an application for respectively the maintenance of a product certificate for the “Timber preservation”.

The quality declaration to be issued has been indicated as a KOMO® product certificate.

The certification and attestation bodies lay down, besides the requirements in this Assessment Directive, supplementary requirements, in the sense of general procedure requirements of certification and attestation as laid down in the general certification or attestation requirements of the body concerned.

The technical field of this AD is E4: Wood preservation Technology with preservatives.

This Assessment Directive replaces: AD 0601 ‘Timber preservation’ 28-04-2010
Existing KOMO® product certificates on the basis of these (and/or earlier) AD versions retain their validity until to 6 months after acceptance of this Assessment Directive.

1.2 Subject

The Assessment Directive concerns the preservation of timber in accordance with the methods under vacuum and pressure and immersion under atmospheric pressure.

1.3 Requirements regarding the certifying body

The certifying body must be accredited by the Raad voor Accreditatie (Dutch Accreditation Council) for the subject of this Assessment Directive according to NEN-EN ISOIEC 17065.

1.4 Definitions

Applicant The executive company, the timber treater as applicant of the KOMO® product certificate.

Producer The executive company, the timber treater as holder of the KOMO® product certificate.

Timber preservation The treatment of timber against biological attacks with a timber preservative by means of the method of vacuum/pressure or the immersion method.

Timber preservative A preventive acting product against timber decaying fungi and/or timber attacking insects allowed in accordance with the Biocide Product Regulation (BPR), in order to lengthen the life span of timber.

Working stock Quantity of ready-to-use impregnation liquid that is contained in the timber preservation system (this is the total of all possible compartments, such as mixing drum and storage drum), in accordance with the directions for use of the supplier of the preservative.

Autoclave, cylinder or vessel The compartment of a vacuum and pressure installation in which the timber is impregnated.

Immersion tank The compartment of the installation in which the timber is immersed.

To refusal In case the prescribed quantity of preservative has not been absorbed when applying the full-cell process, the treatment can be terminated after pressing at least 2 hours.
2. PROCEDURE FOR OBTAINING THE KOMO® PRODUCT CERTIFICATE

2.1 Pre-certification inspection
The inspection body examines whether the statements to be included in the product certificate are in agreement with the Assessment Directive.

2.2 Assessment of the applicant’s quality system
The certification body examines whether the quality system of the applicant is in agreement with chapter 10.

2.3 Issuing of the KOMO® product certificate
The KOMO® product certificate is issued in agreement with the models appointed by KOMO (see www.komo.nl) in accordance with the certification body’s general rules, if the assessment of the quality system of the applicant and the requirements formulated in the Assessment Directive are concluded positively.

2.4 External quality control
Once the KOMO® product certificate has been issued, the certification body carries out inspections as described in chapter 13.
3. **KWALITEITSEISEN**

Quality requirements distinguish themselves from additional requirements owing to the fact that they are established in a different way.

The following standards apply as quality requirements for the *production process* insofar as there are no explicit exceptions or deviations made in this assessment:

- **NEN 2909:1985** Timber preservation. Immersion method.
- **NEN 2913:1992** Timber preservation - Vacuum and pressure method - Treatment with creosote-oil - Requirements with regard to the application of the timber
- **NEN 2930:1991** Timber preservation - Vacuum and pressure treatment method – Treatment with preservatives other than creosote oil
- **NEN-EN 212:2003** Timber preservatives – Guide to sampling and preparation of wood preservatives and treated timber for analysis
- **NEN-EN 335-1:2006** Durability of wood and wood-based products - Definition of hazard classes of biological attack – Part 1: General
- **NEN-EN 335-2:2006** Durability of wood and wood-based products - Definition of hazard classes of biological attack – Part 2: Application to solid wood
- **NEN-EN 351-1:2007** Durability of wood and wood-based products - Preservative-treated solid wood – Part 1: Classification of preservative penetration and retention
4 ADDITIONAL REQUIREMENTS

4.1 Requirements for raw materials

4.1.1 Timber

- The timber to be treated shall be free from:
  - paints and other types of finishes, which could influence the treatment in a negative way;
  - the timber to be treated shall be free from substances, which could influence the treatment in a negative way or could lead to the release of unwanted emissions to the air, the soil or the water during the production, the users phase or the waste phase;
  - saw and planing leftovers to prevent an undesired flowing of waste (sludge etc.);
  - frost, dirt, ice, snow etc.;
  - visible attack by fungi or other micro-organisms influencing the treating process. Blue stain, however, is allowed up to a maximum of 5% of the timber surface;
  - round wood shall be free from bark and cambium (round wood peeled according to NEN 5492).
- The average moisture content of the timber to be treated shall be below 30%. For sawn spruce the average shall be lower than 35%. For the determination of the moisture (according to NEN 5461) the wettest place in the timber and measured in the middle of the parcel shall be the determining factor. Quality level AQL10 according to NEN 5461, shall be used as criterion of approval.
- Planed and sawn timber shall be put on stickers in order to promote the accessibility of the preservative and, if a process of accelerated fixation follows, to guarantee the heat transmission on the timber surface. Stickers shall be of equal thickness. Timber species and treatment of the stickers shall preferably be in agreement with the timber to be treated and the preservative.
- Timber in which case sticking marks are undesirable (as e.g. in façade covering) may be stickered per two layers (with the faces towards each other).
- Processing to the timber shall all be completed before treatment is started. If it is unavoidable that processing will be done after treatment of the timber, the processed parts shall receive an after treatment with a preservative permitted for the application.
- In one charge only timber of equivalent treatability and the same moisture content shall be treated. Table 1 lists the most commonly used timber species. For the timber species not listed see NEN-EN 350-2. Round wood and sawn timber should not be mixed. These requirements do not apply in case of vacuum/pressure treatment ‘to refusal’.

<table>
<thead>
<tr>
<th>Timber species</th>
<th>Botanical name</th>
<th>Degree of impregnation</th>
<th>Heartwood</th>
<th>Sapwood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fir</td>
<td><em>Abies alba</em></td>
<td>moderate</td>
<td>easy/moderate</td>
<td></td>
</tr>
<tr>
<td>Pine</td>
<td><em>Pinus spp.</em></td>
<td>difficult</td>
<td>easy</td>
<td></td>
</tr>
<tr>
<td>Hemlock (western)</td>
<td><em>Tsuga heterophylla</em></td>
<td>moderate/difficult</td>
<td>easy</td>
<td></td>
</tr>
<tr>
<td>Larch, European</td>
<td><em>Larix decidua</em></td>
<td>difficult/very difficult</td>
<td>easy</td>
<td></td>
</tr>
<tr>
<td>Oregon pine/Douglas</td>
<td><em>Pseudotsuga menziesii</em></td>
<td>difficult/very difficult</td>
<td>moderate/difficult</td>
<td></td>
</tr>
<tr>
<td>Spruce</td>
<td><em>Picea spp.</em></td>
<td>difficult</td>
<td>difficult</td>
<td></td>
</tr>
</tbody>
</table>

1) for the meaning of easy, moderate, difficult and very difficult consult NEN-EN 350-2.

4.1.2 Timber preservative

4.1.2.1 Preservatives allowed

A KOMO® product certificate holder is for the purposes of the treatment of timber only allowed to apply timber preservatives for which a Suitability Declaration Timber Preservatives has been issued by an authorized certification body (SKH Publication 06-04 "Basis of assessment for Wood Preservatives". For an overview see the website of the relevant certification body.
In addition a Material Safety Data Sheet of a approved preservative shall be available at the company. The producer shall apply the preservative in accordance with the provisions in the national authorisation approval, the Suitability Declaration Timber Preservatives and supplementary regulations of the supplier.

4.1.2.2. Composition of Preservatives

The composition of the working stock of the wood preservative should be at least 2x per annum on the amount of the active ingredients (so-called chemical balance) according to the method appropriate to the Suitability Declaration Timber Preservatives. This analysis may be carried out by the supplier of the preservatives. In case of disturbance of the chemical balance, the frequency of the controls can be increased by the certification body.

The certification body has the right to have a control at least 1x per year on the amount of the active ingredients in accordance with the method of analysis contained in the Suitability Declaration Timber Preservatives at an independent, accredited analysis laboratory. An identical sample is always stored for the purposes of a second opinion. The control sample is analysed on all active ingredients. The results must correspond to the composition set out in the authorisation approval and in the Suitability Declaration Timber Preservatives, with the relevant maximum permissible deviations.

4.1.2.3. Concentration control

The concentration of the working stock shall be determined and registered daily and during each addition of preservative. This measurement takes place by means of the method as laid down in the instruction supplied by the supplier of the preservative. The concentration of the working stock shall, if required, be brought to the prescribed concentration.

When an installation has been equipped with separate compartments for the storage of the working stock the concentration in each compartment of the preservative shall be determined and registered.

The concentration of the work stock shall be tuned to the required retention in combination with the number of litres that can be taken up by the timber to be treated.

4.2. Requirements for factory equipment of the producer

In order to quality for a quality declaration an applicant must have industrial operating equipment complying with the following requirements.

- If an environmental permit has been issued to the certificate holder, it is assumed that the requirements laid down have been complied with.
- If an environmental permit has not been issued, the requirements may be supported with technical specifications and certification reports of the relevant equipment or may be ascertained during the initial inspection (measurements, markings, visual inspection).

4.2.1 Installation: general

- A mixing system suitable to bring the timber preservative to the correct concentration;
- Provisions for the measuring the consumption of the quantity of timber preservative per treatment. Indirect (subsequent) demonstration is permitted where a close relationship is shown between process parameters and the demanded retention and penetration (i.e. pressure period with uptake determined afterwards);
- The installation material (including the storage vessel, pipes, pumps etc.) shall be such that the composition (and effect) of the preservative is not negatively influenced or contaminated. Pipes shall be installed above ground, may not be fixed to drinking water pipes and the mixing system and may not be conducted through liquid-tight facilities;
- Liquid-tight vessels and floors should be resistant to the effect of the preservative and shall have a free capacity of at least 110% of the maximum quantity of preservative or condensate being processed respectively be in storage;
- The construction of the vessel must be strong enough in order to offer resistance to the liquid pressure resulting in liquid leakage.
4.2.2. **Installation: vacuum pressure**

- The autoclave loaded with timber must be capable of maintaining an air pressure ranging from 20 kPa up to the required pressure (technical specifications, certification reports);
- The storage reservoir must have sufficient capacity to be able to fill the autoclave completely (technical specifications);
- Vacuum and pressure pumps, capable to realize the required air and liquid pressure in the treating autoclave (technical specifications);
- A manometer to read the air and liquid pressure in the treatment autoclave with an accuracy of not more than 10 kPa (technical specifications);
- Recording and registration equipment by which the complete cycle of the process shall be registered legible and the actual status of the process, can be read off;
- The vacuum/pressure installation with accessories (including the storage and mixing vessels) must be installed in or above a liquid-tight vessel (visual inspection);
- The vacuum pump and pressure-release pipes must be equipped with a water lock or equivalent device (visual inspection).

4.2.3 **Installation: immersion**

- The immersion installation shall have sufficient dimensions to be able to fully submerge the timber to be treated and shall have a facility to prevent the floating of the timber to be treated (technical specifications);
- The draining system has been constructed in such a way that the leaking liquid returns to the reservoir with working liquid (visual inspection);
- The floor under the immersion installation and the place where the timber drains shall be liquid-tight and shall be constructed in such a way that the liquid collected can be re-used in the process (visual inspection);
- The installation with accessories shall be positioned in or above a liquid tight tank.

4.3 **Storage and mixing of preservative**

- A reservoir shall be provided with an efficient ventilation and a high level security to prevent that no more than 95% of the maximum contents is filled. Each reservoir shall have a reliable and safe sampling point (visual inspection);
- Each connection to a reservoir below the highest liquid level shall have a metal valve as near as possible to the wall of the reservoir. This seal shall be executed in such a way that it is clearly visible whether the valve is open or close.

4.3.1 **Storage of cresote oil**

- The heating by which the contents of a tank can be heated shall be set up in such a way that the temperature of the liquid in the tank shall not come above the starting boiling point of the hydrocarbon fractions, determined according to the ASTM, method D-86 (technical specifications).
- The tank shall be provided with at least a thermometer directly installed on the tank indicating the temperature of the contents. In case of more than one meter these shall measure independently from each other (visual inspection). Accuracy ±2 °C, calibrated every 10 year. Tanks in which shall be used under pressure shall be provided with pressure-vacuum valves which are assembled above the highest liquid level (to be determined by visual inspection); These pressure-vacuum valves shall be constructed in such a way that rain can not enter the system (to be determined by visual inspection);
- The valves shall be installed in such a way that freezing respectively caking or crystal forming, is not possible. They shall, under all circumstances, function fluently and without sparks (technical specifications);
- The safety valves may only open, when the over- and under pressure determined for the tank, are exceeded. All other openings that are situated on the roof shall, except for measurements and maintenance, always be closed;
- Vapours emitting from the storage tank shall, before being transported to the outside air be guided, via an efficient condenser or another efficient provision, in order to limit as the emission of cresote fractions as much as possible (to be determined by visual inspection).
4.3.2 **Storage in packaging:**
The storage of preservatives in packaging shall take place in a storage site according to the guidelines of the Committee Prevention of Calamities by Dangerous substances, PGS15 ‘Storage of hazardous substances in packaging, storage of liquids and solid substances’.

4.4 **The deceleration track**
The deceleration track of the vacuum/pressure installations shall be placed on a liquid-tight floor. The floor shall be situated on sufficient fall, shall be kept clean and draining to the storage tanks under the installation or elsewhere and shall have a connection that is liquid-tightresistant (to be determined by visual inspection or by certification documents).

The post-treatment
To comply with the requirements, see also 4.2
- An post-treatment installation shall be positioned in, or in the direct area of the area or the building where the treating installation has been situated. The area where the impregnated timber is transported from the treating installation to the post-treatment installation shall be asphalted liquid-tight.
  For the transport of dry, drip free timber normal asphalting is enough. Precipitation and draining liquid shall be returned to a storage in order to be re-used in the process.
- The post-treatment installation shall be situated in a liquid-tight tank.
- The liquid being released during the post-treatment shall be received and be returned to a storage reservoir for the preservative or to another storage tank destined for the storage of the free coming liquid, or shall have to be cleaned.
- Both in case of natural fixation under cover (or otherwise protected from precipitation) and fixation in conditioned rooms, the impregnated timber shall be placed on a liquid-tight floor. Precipitation and drained liquid shall be re-directed to a storage reservoir in order to be re-used in the process.

4.5 **Storage of impregnated and fixed timber.**
- In case the storage of impregnated and fixed timber takes place in the open air, the relevant part of the site shall be laid hardened and on a slope to drainage points or drainage pipes being connected with a suitable drainage system.
  The asphalting shall be well maintained

4.6 **Requirements in connection with the raw material control**
The KOMO® product certificate holder shall dispose of the following:
- An electric moisture meter for the determination of the moisture content in accordance with NEN 5461. The moisture meter shall be adjustable for the timber species and timber temperature.
- Tape measure for the determination of the width, thickness and length of sawn timber and the circumference of round wood.
- Fit for the determination of the diameter of round wood according to NEN 5492.
- Equipment for determining the strength of the work liquid of the preservative, such as for example an areometer/thermometer combination, a refractometer or equipment for titration, or the requirements respectively computer software as described in the instructions by the supplier of the preservative used. In the case of automatic concentration determination of the strength, this should be calibrated at least 1 x per week with a measurement executed with controlled equipment.

4.7 **Requirements for checking the end-product**
Depending on the wood preservative and the requirements with respect to penetration depth, KOMO® product certificate holders should possess:
- an increment borer with an internal diameter of at least 4 mm for determining the penetration depth;
- product-specific reagent for determining the penetration depth (depending on the type of preservative);
- software or procedures in order that guarantee that the required retention(s) is/are achieved (to be determined during initial inspection);
- the procedure supplied by the supplier of the preservative in order to demonstrate adequate fixation of the preservative in the end-product.
5 VOLUME- AND SURFACE AREA CALCULATION

A Correct calculation of the volume shall take place before of the production process.

5.1 Roundwood

The calculation of the volume of round wood on behalf of the treating process shall be based on the following formulae.

For cylindrical milled round wood:

\[ V = \frac{1}{4} \times \pi \times d^2 \times l \times n \]

legend:
- \( V \) = volume in \( m^3 \)
- \( d \) = diameter in \( m \)
- \( l \) = length in \( m \)
- \( n \) = number of pieces

For peeled round wood:

\[ V = \frac{1}{12} \times \pi \left( D^2 + D \times d + d^2 \right) \times l \times n \]

legend:
- \( V \) = volume in \( m^3 \)
- \( D \) = diameter in \( m \) at 10 cm from the thickest end
- \( d \) = diameter in \( m \) at 10 from the thickest end
- \( l \) = length in \( m \)
- \( n \) = number of pieces

\( V \) can also be determined by means of tables for measuring the cubic contents, as referred to in appendix 2. In case of half round wood the volume is divided by 2.

5.2 Sawn, planed and profiled timber

The calculation of volume of sawn, planed and profiled timber on behalf of the treating process takes place on the basis of length \( \times \) width \( \times \) thickness, taking into consideration possible planed respectively profiled timber.

The calculation of the surface takes place on the basis of:

\((2 \times \text{length} \times \text{width}) + (2 \times \text{length} \times \text{thickness}) + (2 \times \text{thickness} \times \text{width})\).
6 CALCULATION OF RETENTION

The retention to be realised shall be in accordance with the Suitability Declaration Timber Preservatives.

6.1 Retention in kg/m$^3$

The definition of retention is the quantity of preservative left behind in the timber per treatment. In case of the vacuum pressure method this quantity consists of the ‘initial uptake’ when the autoclave is filled with the preservatives, litres pumped away during the pressing period and litres returned during and after the final vacuum. It is therefore incomplete to estimate the usage by means of the quantity of litres pressed away.

The registration of the usage shall be based on the difference in volume or weight of the work stock before and direct after impregnation and/or the difference in weight of the timber direct before and direct after the impregnation process.

The calculation of the retention, expressed in kg/m$^3$, is executed using the following formula:

\[
R = \frac{(V_0 - V_e) \cdot C}{V_{H} \cdot 100}
\]

or

\[
R = \frac{(m_{na} - m_{voor}) \cdot 1/d \cdot C}{V_{H} \cdot 100}
\]

Legend:
- $V_0$: Volume of original stock of working liquid (l)
- $M_{after}$: mass of the timber after treatment (kg)
- $V_e$: Volume of the end stock of working liquid (l)
- $m_{voor}$: mass of the timber before treatment (kg)
- C: Concentration of the solution (%)
- d: Volumetric mass of the treatment liquid (kg/l)
- $V_{H}$: Volume of the timber to be treated (m$^3$ hout)
- R: Retention in kg/m$^3$

6.2 Retention in g/m$^2$

The calculation of the retention expressed in g/m$^2$ (immersed timber) take place as follows:

\[
R = \frac{(V_0 - V_e) \cdot C}{O \cdot 100}
\]

Legend:
- $V_0$: volume initial stock of treatment liquid (l)
- $V_e$: volume end stock of treatment liquid (l)
- O: Surface area of the timber treated (m$^2$) \((2(l \cdot b) + 2(l \cdot d) + 2(d \cdot b)) \cdot N\)
- C: concentration in %
- R: Retention in g/m$^2$

6.3 Retention and Suitability Declaration Timber Preservatives

Conversion of the critical value included in the Declaration of Suitability in the penetration zone to the retention per m$^3$ of total timber volume is calculated by the following formula:

\[
E = \frac{A - B \cdot kw}{A}
\]

Legend:
- E: Retention in kg/m$^3$
- A: Total volume of timber of the charge
- B: Volume of the zone not to be penetrated of the charge
- Kw: Critical value
6.3.1 **Sawn timber**

Volume of the total charge (A):

\[ A = (d \times b \times l \times N) \]

Volume calculation of the zone not to be penetrated (B):

\[ B = ((d - 2p) \times (b - 2p) \times (l - 2a) \times N) \]

where \( d \) = thickness in m

6.3.2 **Cylindrically milled round wood:**

Volume calculation of the total charge (A):

\[ A = \left(\frac{1}{4} \times \pi \times d^2 \times l \times N\right) \]

Volume calculation of the zone not to be penetrated (B):

\[ B = \left(\frac{1}{4} \times \pi \times (d - 2 \times p)^2 \times (l - 2 \times a) \times N\right) \]

where \( d \) = diameter in m

6.3.3 **Debarked round wood:**

Volume calculation total charge (A):

\[ A = \left(\frac{1}{12} \times \pi \times (D^2 + D \times d + d^2) \times l \times N\right) \]

Volume of the zone not to be penetrated of the charge (B):

\[ B = \left(\frac{1}{12} \times \pi \times ((D-2p)^2 + ((D-2p)^2) + (d-2p)^2) \times (l-2a) \times N\right) \]

where:

- \( D \) = diameter in m at 10 cm from the thicker end
- \( d \) = diameter in m at 10 cm from the thinner end

Other abbreviations:

- \( b \) = width in m
- \( l \) = length in m
- \( N \) = number of items
- \( p \) = the penetration zone to be analysed appropriate to the selected NP class (laterally) (in m’)
- \( a \) = the penetration zone to be analysed appropriate to the chosen NP class at the end grain (in m’)
- \( E \) = retention in kg/m³
- \( kw \) = critical value in kg/m³ as shown in the authorisation order for the relevant use class
7 METHODS OF TREATMENT

7.1 General for vacuum/pressure and immersing.
- The procedures to be applied for the impregnation of timber in the relevant installations shall be laid down in a manual being present in the layout. In the manual at least the following actions shall be carried out and also which pressure and time at which point of time shall be recorded. The manual shall be near the impregnation installation.

- Nearby the installation a process register shall be available in which each charge of impregnated timber has been registered under which circumstances the impregnation process has taken place, the time thereof and whether a certain form of post-treatment has taken place.

7.2 The impregnation under vacuum and pressure.
- The autoclave shall be closed after the timber has been placed in the autoclave. The registration apparatus shall be made ready and started as soon as a start has been made with the treatment. The timber can not be subjected to an initial vacuum. Subsequently the timber preservative is admitted to the autoclave until completely filled and all the timber is completely submerged under the preservative. After that a pressure is built-up in the autoclave under admission of preservative the preservative is pressed into the timber. During the pressing phase the autoclave stays also completely filled with preservative. Subsequently the pressure is ended after removal of the timber preservative it is followed by a post vacuum or final vacuum. At the end of each charge the quantity of preservative taken up is registered.

- After the final vacuum provisions or procedures shall be guaranteed in such a way that human beings will not be exposed to the preservative in the form of mist (keep a rest period of 30 minutes before opening the installation).

- In order to obtain an effective, clean fixation it is necessary to place the timber on a slope in the treating vessel. The treated timber shall in each case be sufficiently leaked out before fixation. This slope shall be at least 4 °.

7.2.1 Pressing ‘to refusal’
In case of pressing to refusal a full treatment shall always be applied. The following scheme shall be kept.

Initial vacuum period
Reduce the pressure in the treatment autoclave to an absolute air pressure not exceeding 20 kPa and keep this pressure reducing during at least 15 minutes. Fill the autoclave after this with the timber preservative maintaining the reducing of the pressure.

Pressing period
Increase the pressure on the timber preservative up to at least 900 kPa. When the prescribed quantity of preservative has not been absorbed when applying the full-cell process, the treatment can be terminated after pressing for at least 2 hours. This shall explicitly be reported on the treating form. Remove the timber preservative from the autoclave after pressing.

Final vacuum period
In order to let the surface of the timber dry quicker the timber shall once more be subjected to a vacuum at the end of the process. Decrease thereto the air pressure again to an absolute pressure not higher than 20 kPa and keep the air pressure decrease for at least 15 minutes.

7.3 The immersion method
- When using the immersion method the timber to be treated shall be completely immersed in a preservative during the time prescribed by the supplier, being depending on the timber species, the preservative to be applied, the application purpose and the retention required.
The immersion method can be considered when it is indicated explicitly in the Suitability Declaration Timber Preservation (SDTP) that this method may be used.

- The timber to be treated shall either be immersed in the preservative with at least taking it up and down once, or shall be put in the treatment container and let the preservative completely fill the container.

- Let the timber completely immersed during the time required to obtain the required result and pump subsequently the preservative out of the reservoir or take the timber out of the immersion installation.

- Let the timber drain for at least 20 minutes under a slope of at least 4 ° in such a way that the timber can be transported dripping-free over the hardened working site.

- Determine the retention realised.

### 7.4 Data to be registered by the producer

The producer shall at least record the following of each charge:

- date and charge number;
- timber species;
- specification of the charge (moisture content, dimensions, volume of timber or surface area of timber);
- results of control of raw materials (section 4.1.1);
- Use class (in accordance NEN-EN 335-1 Table 4);
- name of preservative (*number of approval by CTGB*);
- net retention in kg/m³ (for vacuum and pressure treated timber) respectively in g/m² for immersed timber) as derivative of concentration and consumption of work liquid;
- method of treatment;
- course of the process (development of pressure over a period of time or time of immersion, temperature);
- method and development of the process of the post-treatment per charge;
- results of control of depth of penetration in case of vacuum/pressure treated timber
8 **POST-TREATMENT**

In case of water miscible preservatives a process shall be followed in which the components of the preservative can be fixed to the timber (= fixation) before the timber can be released for sale and/or application. Beside natural fixation, where the period of time is dependent on temperature and type of preservative, there are also accelerated fixation methods.

An accepted method of accelerated fixation is the heating of the impregnated timber under climatic conditions by means of application in of saturated steam. In particular the timber temperature and the time of heating determine the degree of fixation. There shall be an automatic registration of the temperature and the time.

Other methods for accelerated fixation are also accepted in case they are included in the Suitability Declaration Timber Preservatives and it is demonstrated that the degree of fixation is achieved with the method used is sufficient.
9 REQUIREMENTS FOR THE FINISHED PRODUCT

9.1 Depth of penetration

The control on the required penetration take place by means of (drill) cores or on cross cut faces of components sampled from the consignment treated. The requirements in respect of the penetration have been included in the tables 4 and 5.

The requirement for penetration refers to the lateral penetration of the sapwood but also includes the heartwood in case heartwood and sapwood cannot be distinguished visually.

**Tabel 2: Classes of penetration (NP = New Penetration class)**

<table>
<thead>
<tr>
<th>Penetration classes according to NEN-EN 351-1</th>
<th>Zone to be analysed for retention</th>
<th>Penetration required</th>
<th>Timber species difficult to impregnate</th>
<th>Timber species easy to impregnate</th>
</tr>
</thead>
<tbody>
<tr>
<td>NP1</td>
<td>3 mm</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>NP2</td>
<td>3 mm lat.</td>
<td>≥ 3 mm lat.</td>
<td>≥ 3 mm lat.</td>
<td></td>
</tr>
<tr>
<td>NP3</td>
<td>6 mm lat.</td>
<td>≥ 6 mm lat.</td>
<td>≥ 6 mm lat.</td>
<td></td>
</tr>
<tr>
<td>NP4*</td>
<td>25 mm lat.</td>
<td>≥ 25 mm lat.</td>
<td>--</td>
<td>Complete sapwood + ≥ 6 mm heartwood on the outside</td>
</tr>
<tr>
<td>NP5</td>
<td>Complete sapwood</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NP6</td>
<td>Complete sapwood</td>
<td>--</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

lat. = lateral (sideways)

*) NP4 applies only to round wood (specifically telephone poles).

**Tabel 3: Required penetration by hazard class**

<table>
<thead>
<tr>
<th>Use class (NEN-EN 335-1)</th>
<th>Timber species difficult to impregnate</th>
<th>Timber species easy to impregnate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NP1</td>
<td>NP1</td>
</tr>
<tr>
<td>2</td>
<td>NP1</td>
<td>NP2</td>
</tr>
<tr>
<td>3</td>
<td>NP1</td>
<td>NP5</td>
</tr>
<tr>
<td>4</td>
<td>NP2</td>
<td>NP5</td>
</tr>
<tr>
<td>5</td>
<td>--</td>
<td>NP6</td>
</tr>
</tbody>
</table>

The requirements included in these tables apply unless general accepted deviating product specifications are used for certain well-defined products on the basis of European or national standards.

Tolerances

- It is sometimes not possible to treat the intermediate zone (between sapwood and heartwood). This can be ignored when assessing the depth of penetration. This untreated zone cannot be more than 2 annual rings away from the heartwood.

- The assessment of the depth of penetration shall take place after completion of the post-treatment.

- The penetration shall be determined by means of a sampling (NEN-EN 351-2). The following maximum deviations, expressed as a percentage of units of the consignment (poles, boards) that not comply with the penetration requirements, are allowed:
  - 10% for timber species easy to be penetrated.
  - 25% for timber species difficult to be penetrated.

- The penetration shall be assessed weekly in 5 boards or poles of a charge taken at random. Charges being treated to refusal are not considered for this sampling.

Direct testing of samples on penetration may be impractical during normal operating circumstances (third party impregnation). Indirect demonstration is permitted if a direct relationship between penetration, retention and the process parameters of the preservation process. (to be assessed by the certifying body)
The accuracy of this relationship must be determined at least 2x per year. This analysis may be carried out by the supplier of the wood preservatives. The certifying body can increase the testing frequency if an adequate relationship is shown.

The certifying body has the right to perform a control on the penetration at least 1x per year at an independent accredited analysis laboratory.

Samples shall be taken from straight pieces of timber without splits or defects and at least 10 cm from knots. The assessment must be done in the middle of the test sample (plank, beam) and at least 50 cm from the end.

The assessment shall be carried out both with an increment borer or on the end grain of the sample according to NEN-EN 351-2.

If there is no clear difference between heartwood and sapwood a colouring test liquid can be used. The assessment of the depth of penetration by the active ingredient will be done visually by means of the method prescribed by the supplier.

9.2 Retention

The retention determined after the impregnation process may not be lower than the retention required as prescribed in the SDTP. Considering the normally occurring variation in impregnability a tolerance, measured over a complete charge, on the prescribed net retention of – 10% is allowed.

When the retention realised is lower, the consignment shall be retreatment until the retention prescribed has been realised, unless a full treatment up to refusal has taken place using the vacuum pressure method (minimum pressure time of 120 minutes).

Random sampling is used to determine retention by chemical analysis based on the samples taken for the penetration depth. The retention is determined at least 2x per year. This analysis may be carried out by the supplier of the preservatives. The certifying body has the right to perform a control on the retention at least 1x per year at an accredited analysis laboratory. The chemical analysis is carried out in accordance with the assessment method(s) included in the Suitability Declaration Timber Preservatives.

9.3 Fixation

Before the treated timber may leave the process area it shall be demonstrated that a sufficient degree of fixation has been reached. The process area is the area where all actions take place that have an adequately fixated timber as end result.

Sufficiently fixated timber is defined as timber of which on the basis of the in-company test is demonstrated that the degree of fixation has been reached sufficiently. The protocol for the in-company test 2007 has been included in appendix 3a. The certification-body can, on the basis of an advice by the Assessment Committee Timber Preservatives decide to use another in-company test.

The frequency of the test has been determined once a week on a random board from a random batch. Depending on the results the certification-body can decide to use another frequency in accordance with section 5.1.3.3 of the Basis of Assessment Timber Preservatives (SKH publication 06-04).

9.3.1 In-company test for the determination of leaching of chromium free, copper containing preservatives soluble in water

Execution

As in-company test use can be made of the in-company test 2007 of the protocol of which has been included in appendix 3a.

Frequency

The in-company test 2007 shall be carried out 1x per week.

Limiting values

The following targets apply for the leaching, determined according to the in-company test 2007.

For chromium free, copper containing preservatives:

- copper: 1,6 mg/l Cu and a minimum storage time of 48 h.
- 0,8 mg/l Cu and a minimum storage time of 24 h.
9.3.2 In-company test for the determination of chromium containing preservatives soluble in water

Execution
- As in-company test use can be made of the chipping test the protocol of which has been included in appendix 3b.
- Before another method can be used as in-company test a correlation has to be found between the values obtained from this in-company test and the prescribed values determined in accordance with the shower test (IRG/wp 93-50001). The protocol for this other method shall have to be approved by the certifying-body.

Frequency:
- In case of a processed controlled accelerated fixation the in-company test shall be carried out at least 1x per week.
- In case of natural fixation an in-company test shall be carried out on each consignment, before the consignment may leave the process area.

Limiting values:
The following guideline applies for the leaching determined in accordance with the chipping method:

For chromium containing preservatives:
- copper: 0,5 mg/l
- chromium: 3 mg/l
10 REQUIREMENTS REGARDING THE QUALITY SYSTEM

10.1 General
Requirements have been formulated in the following sections to which the quality system of the producer shall have to comply.

10.2 Responsibility
The producer is responsible for the production process of the product, for the internal quality control and for the finished product.

10.3 Quality System Manager
Within the company, an official representative must be appointed who is responsible for maintaining the Internal Quality Control Scheme.

10.4 Quality System

10.4.1 Document Control
The written procedures for inspection and testing shall be assessed and approved for suitability and effectiveness by authorised persons within the company before distribution. Document control must ensure that only valid documents are available for inspection and testing. The documents shall be in Dutch, in English or German.

10.4.2 Inspection and testing

10.4.2.1 Internal Quality Control
The producer shall keep an Internal Quality Control Scheme. At least the following aspects and procedures should be included in writing:
- Incoming inspection of raw materials;
- Workplace instructions;
- Control of the production process;
- Control of the finished product (retention);
- Control of the finished product (storage, maintaining product characteristics);
- Control of measuring equipment;
- Result of calibration measurement of working liquid concentration (4.7);
- Recording complaints.

Non-conformity products
Products or parts of products that during the production process do not comply with the requirements shall be isolated and clearly marked. If necessary preventive and corrective measures shall be taken.

10.4.2.2 Registration
A registration shall be kept of the inspections and tests described in the Internal Quality Control Scheme. Registered data need to be kept for a period of at least 10 years. The manufacturer should have an appropriate and accessible registration of the inspections and tests carried out and keep these up to date in order to be able to show that the requirements have been complied with. Where necessary statistical methods shall be applied to the test results.

10.4.2.3 Calibration
Measuring and testing equipment shall be calibrated/controlled at least once a year. A registration shall be kept of this calibration/controlled.

10.4.2.4 Supplies
The timber to be treated shall be controlled upon receipt in accordance with the requirements mentioned in section 4.1.1. The results of this raw material inspection shall be registered.
The preservative shall be controlled every delivery on:
- quantity/number of units of the preservative supplied;
- the type of preservative supplied. This control consist of a check of the accompanying transport documents, the analysis report, as well as the labelling on the packaging units.

Clear recordings shall be kept of the type and quantity of the preservative delivered and the use thereof shall be present an behalf of the control by the certifying body.

10.4.2.5 Laboratory
For the execution of the tests as indicated in the instructions of the supplier (fixation, penetration, retention) the company shall havef the prescribed test equipment and test apparatus and have a separate area in which the test can be executed.
An external laboratory shall be accredited according to NEN-EN-ISO/IEC 17025.

10.4.2.6 Non-conformity Products
Products or parts of products that during the production process do not comply with the requirements shall be isolated and clearly marked.
In case of an accidental shortcoming, it is sufficient to perform a correction on the production (disposal of the products or re-treatment).
In case of a structural shortcoming, restart of production can only begun after implementation of corrective measures and after re-control by the Certified Body.

10.4.3 Handling of complaints
The producer (holder of the product certificate) shall maintain a registration of complaints and that complaints are properly dealt with, related to the treated product refered to in the product certificate and the application thereof.
For every complaint there shall be indicated how the complaint was analysed and dealt with and where necessary taken corrective measures.
11 MARKING

The treated timber supplied with the KOMO® product certificate shall be marked per bundle or per packaging unit with:

1. The application of the KOMO®-mark or logo.
2. The application of the certificate number and/or name of the manufacturer of the treated timber.
3. The application of a unique production/charge number. When breaking the bundle this number need not be present on each unit. From each charge it shall be administered what the numbers are and by which process parameters the timber has been treated;
4. A statement for which application the treated timber is suitable by means of at least the use class indication according to NEN-EN 335-1, or a colour or letter code as mentioned in table 4.
5. A statement of the trade name or the approval number of the preservative by which the timber has been treated.

Location of the mark: clearly and indelible on each bundle or packaging unit.

Table 4: Areas of application based on the use classes according to NEN-EN 335-1

<table>
<thead>
<tr>
<th>Use class</th>
<th>Application Area</th>
<th>Colour Code</th>
<th>Letter Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Above ground, not exposed to the elements</td>
<td>Black</td>
<td>L</td>
</tr>
<tr>
<td>2</td>
<td>Above ground, with risk of wetting</td>
<td>Orange</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Above ground and periodically in contact with rain water</td>
<td>Blue</td>
<td></td>
</tr>
<tr>
<td>4a</td>
<td>Contact with ground and ground water</td>
<td>White</td>
<td>G</td>
</tr>
<tr>
<td>4b</td>
<td>Permanently in ground (water) contact or fresh water contact</td>
<td>Green</td>
<td>W</td>
</tr>
<tr>
<td>5</td>
<td>Permanently in contact with brackish or salt water</td>
<td>Red</td>
<td>Z</td>
</tr>
</tbody>
</table>
12 INSTRUCTIONS FOR THE USER

For each delivery of a consignment of treated timber the producer shall supply instructions for the purchaser/user/consumer with the following content:

- This product has been treated with the preservative legally approved in the Netherlands according to the method. (trade name of the preservative + Number of approval)

Certificate holders in foreign countries shall formulate this as follows:

This product has been treated with the preservative according to the method and agrees with that being legally allowed in the Netherlands according to Ordinance of Approval SDTP (no. SDTP, date)

- Legal instructions for use and limitations for the timber treated with this preservative (when applicable).

- When processing this product the normal safety instructions shall be taken in consideration such as in case of untreated timber.

- Processing to the timber shall all be completed before treatment is started. If it is unavoidable that processing will be done after treatment of the timber, the processed parts shall receive an after treatment with a preservative permitted for the application.

- Timber leftovers and sawdust shall be disposed of as domestic waste (private) or industrial waste (professional). It is not allowed to burn these in an open fire place, wood-burning stove or open fire.

- At the end of the period of use, treated timber shall be disposed of in accordance with the relevant legal instructions.

Design of Instructions:

This is a free choice of the producer and depends on the product and buyers category. One could think of a sticker at the back of the invoice or delivery slip, insertion in a folder or instructions for use with a do-it-yourself kit.

In order to inform the (end) user sufficiently the supplier is required to pass on this instruction to each buyer.
13 REQUIREMENTS REGARDING EXTERNAL QUALITY CONTROLS

13.1 General
External quality control is determined by the certifying body in accordance with the Regulations for Product Certification of the certification body.

13.2 Initial Inspection
The certification body controls during the initial inspection whether the relevant factory complies with the requirements as given in this Assessment Directive. A report of the initial inspection shall be made, on the basis of which the KOMO® product certificate shall be issued, with or without certain conditions.

13.3 Annual Controls
The certification body controls 3x per annum, without prior notice, whether the products comply with the technical specifications as mentioned in sections 4.1, 4.6, 4.7 and 4.8 and chapters 5 to 9, whether the production is in accordance with the specifications agreed upon between producer and the certification body and whether the internal quality system of the producer complies with the requirements of chapter 10.
If necessary, on the recommendation of the Board of Experts, the above-mentioned frequency of the inspections may be adjusted on the basis of the reasons presented.

A written report of these controls shall be made.
On the recommendation of the Board of Experts, the frequency of controls mentioned above can be adjusted.

The technical aspects noted in sections 4.2, 4.3, 4.4 and 4.5 shall be fully controlled during the initial inspection and in case the treatment installation is modified.
The aspects to be controlled by the certifying body are shown in the standard checklist as mentioned in Appendix 1.
In addition the certifying body shall control at least 1x per 2 years whether there have been any modifications to the installation or the company.
14 REQUIREMENTS REGARDING THE CERTIFYING BODY

14.1 General
The certifying body shall comply with the requirements according to NEN-EN –ISO/IEC 17065. In addition, the body must be accredited by the Raad voor Accreditatie (Dutch Accreditation Council) or have initiated the application procedure for the scope of this Assessment Directive.

The certifying body shall have a set of regulations, or an equivalent document, in which the general rules are mentioned to comply with for certification. In particular, these are:

- The general rules for performing the initial inspection, split into:
  - Procedure to inform about the administrative process of an application;
  - Procedure for execution of the initial inspection;
- Procedure for decision of acceptation based on the initial inspection;
- The general rules with respect to perform controls and inspections and the controlled aspects of these inspections;
- The measures to be taken by the certifying body in the event of non-conformities;
- The rules for termination of a certificate;
- The option of making an appeal against decisions or measures imposed by the certifying body.

14.2 Certification Staff
The staff concerned with the certification process is defined as followed:

- **Inspector**: tasked with carrying out the external controls;
- **Initial Inspector**: tasked with carrying out the initial inspection and assessing the reports of tests and laboratory;
- **Assessor**: assessment of the initial inspection controller and controller; decisions on the need for taking corrective measures;
- **Decision-taker**: tasked with taking decisions based on the initial inspections carried out, continuation of certification on the basis of the annual controls.

14.3 Qualification Requirements
Staff concerned with the certification process shall be qualified demonstrable for the activities required. The following qualification requirements apply in respect of education, training, expertise and experience as mentioned in Table 5.

<table>
<thead>
<tr>
<th>Certification position</th>
<th>Training</th>
<th>Expertise and Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspector</td>
<td>MBO level</td>
<td>- Production and use of preservatives or equivalent</td>
</tr>
<tr>
<td>Initial Inspector</td>
<td></td>
<td>- Training as auditor ISO 9001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Two years’ experience in the timber industry or equivalent</td>
</tr>
<tr>
<td>Assessor</td>
<td>HBO level</td>
<td>- Construction training or equivalent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Production and use of preserved timber</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Training in the timber sector or equivalent relevant experience</td>
</tr>
<tr>
<td>Decision-taker</td>
<td>HBO level</td>
<td>- Management experience</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Certification experience or equivalent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Knowledge of accreditation criteria or equivalent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Knowledge of relevant certification systems</td>
</tr>
</tbody>
</table>

Staff shall be qualified demonstrable by means of assessing training and experience based on the above mentioned requirements. If qualification is based on different criteria this must be registrated.
14.4 **Reporting to the Board of Experts**

The certification body reports at least annually about the work done for the specific field of certification. In this report the following aspects must be mentioned:

- Changes in the number of certificates (new/ended);
- Number of controls performed in relation to the prescribed control frequency;
- Results of the controls and inspections.
15 TITLES OF REFERRED DOCUMENTS


NEN 2909:1985 Woodpreservation - Immersion method
NEN 2913:1992 Woodpreservation - Vacuum and pressure method - Treatment with creosote-oil - Requirements with regard to the application of the wood.
NEN 2930:1991 Woodpreservation - Vacuum and pressure treatment method - Treatment with preservatives other than creosote oil.
NEN 5492:1985 Quality requirements for timber - Wooden poles
NEN-EN 45011: 1998 General requirements for bodies operating product certification
NEN-EN-ISO 9001:2008 Quality management systems - Requirements
NEN-EN-ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories
NEN-EN-ISO/IEC 17065:2012 Conformity assessment - Requirements for bodies certifying products, processes and services
SKH-Publication 06-04: 4-15-2010 Basis of assessment for wood preservatives.

PGS 15 : 2011 Opslag van verpakte gevaarlijke stoffen/ Storage of packaged dangerous substances
Appendix 1: Checklist Initial Inspection Timber preservation under vacuum and pressure and immersion

INFORMATIVE

Name of company: ____________________________
Certificate no.: ____________________________
Date of inspection: ____________________________
Inspector: ____________________________ (signature)
Representative of company: ____________________________ (signature)
Arrangements made on previous inspection dated ____________________________ in order / not in order
Results of analysis of: ____________________________ in order / not in order
______________________________________________________________ in order / not in order

<table>
<thead>
<tr>
<th></th>
<th>correct</th>
<th>not correct</th>
<th>n/a</th>
<th>remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vacuum-pressure impregnation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>installation with accessories</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>storage of preservatives</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>deceleration track</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>post-treatment-installation</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>steam</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>climatic room</td>
<td></td>
<td></td>
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<tr>
<td>hot water</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>natural fixation</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Immering</strong></td>
<td></td>
<td></td>
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<tr>
<td>installation with accessories</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>storage of preservatives</td>
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<tr>
<td>draining installation</td>
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<tr>
<td>post-treatment-installation</td>
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<td></td>
</tr>
<tr>
<td>steam</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>climatic room</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>hot water</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>natural fixation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Storage of treated and fixated timber</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Control of measuring apparatus

<table>
<thead>
<tr>
<th>Item</th>
<th>present (and used)</th>
<th>not present (not used)</th>
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<th>remarks</th>
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<td>moisture meter</td>
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<td>tree fit</td>
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<tr>
<td>areometer / thermometer</td>
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<tr>
<td>refractometer</td>
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<tr>
<td>titration requirements</td>
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<td>increment borer</td>
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<td>pressure and temperature meters</td>
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<td>reagens for determination of penetration</td>
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### Quality system

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<th>remarks</th>
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<tr>
<td>keeping of registration of inspections and tests</td>
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<tr>
<td>registration of calibration of measuring equipment</td>
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<tr>
<td>registration of progress of process in case of vacuum/pressure (time and pressure)</td>
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<tr>
<td>identical in case of immersing (time of immersion and draining)</td>
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<tr>
<td>registration of post-treatment laboratory or externally</td>
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<td>registration of complaints</td>
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### Control of raw materials

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<tr>
<td>free from:</td>
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<tr>
<td>bark, bast, cambium</td>
<td></td>
</tr>
<tr>
<td>saw and planing leftovers</td>
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</tr>
<tr>
<td>paint / other finishes</td>
<td></td>
</tr>
<tr>
<td>snow / ice, frost</td>
<td></td>
</tr>
<tr>
<td>discoloration (max. 5% of bluing)</td>
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</tr>
<tr>
<td>processes executed</td>
<td></td>
</tr>
<tr>
<td>moisture content lower than 30%/resp. 35% (sawn spruce)</td>
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<tr>
<td>timber on stickers</td>
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<tr>
<td>releasing binding material being too firm</td>
<td></td>
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<tr>
<td>per charge of timber of equal treat ability/ timber species, moisture content, round/sawn timber</td>
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</tr>
<tr>
<td>calculation of volume</td>
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<tr>
<td>calculation of surface area</td>
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<tr>
<td>PRESERVATIVE:</td>
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<td>------------------------------------</td>
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<td>MSDS timber preservative present</td>
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<tr>
<td>Instructions of supplier present in respect of:</td>
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<tr>
<td>control of concentration of work storage</td>
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<tr>
<td>procedure of fixation control</td>
<td></td>
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<tr>
<td>time of immersion process</td>
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<tr>
<td>control of depth of penetration</td>
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<td>copy of Ordinance of approval present</td>
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<td>preservative for application allowed used</td>
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<td>concentration of preservative</td>
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<tr>
<td>depth of penetration reached</td>
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<tr>
<td>fixation reached</td>
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<td>product label (applying of correct code)</td>
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<tr>
<td>prescribed temperatures reached</td>
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APPPOINTMENTS:

The following samples have been taken for testing: .................................................................

The results of analysis and the extent of complying with the requirements laid down shall be reported in writing to the certification-body.

The following corrective measures shall be taken by the certificate holder within . . . . . days.

initials
inspector:

initials
company:
APPENDIX 2: Cubing tables round wood

Cubing table for impregnating milled round wood.

Content in m³ per 100 items.

<table>
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<th>Diameter (cm)</th>
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<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
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<td>0,462</td>
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<td>0,353</td>
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</table>

Half-round wood: volumes to be divided by 2.
Cubing table for the impregnation of white peeled timber according to the table for sizes in NEN 5492.  
Contents in m³ per 100 pieces

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<tr>
<th>Diameter (cm)</th>
<th>5</th>
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<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>9/10</th>
<th>7/8</th>
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</tbody>
</table>

The contents of the normal commercial sizes are given in accordance with NEN 5492.

Half-round wood: volumes to be halved.
Appendix 3a: PROTOCOL IN-COMPANY TEST 2007 FOR THE ELEMENT COPPER (Cu)

Material required:
- PVC-ring with an inner diameter of 32 mm (watch sufficient wall thickness in connection with gluing, recommended outer diameter is 40 mm).
- Pipette (non-returnable).
- Squirt (25 – 50 ml).
- Measuring cup;
- Stopwatch.
- Sealant squirt with acid free silicon sealer (recommended: Bison odourless, neutral).
- De-mineralized water (demi-water) or distilled water.
- Test kit for analysing copper.

For copper is allowed: CHEMets Copper Kit K-3510 (visual determination between 0-1 & 1-10 mg/l). Other test kits could be added after approval by BHM.

In case no test case is available the leaching sample shall be transferred in a suitable sample bottle for analysis at a later date and shall be stored in a cool place.

Note the following data on the attached form ‘In-company test 2007’:
- Of the timber to be tested:
  - Date of charge.
  - Charge number.
  - Timber species.
  - Condition of the surface (rough/planed/resinous/etc.)
  - Method of fixation.
  - Concentration of the work liquid.
  - Charge retention.

- Of the in-company test:
  - Date of execution of the in-company test.
  - Time between the end of the impregnation process and the start of the in-company test.
  - Result of the in-company test in mg/l.
  - Initials of analyst.

Other data:
- Other data such as vacuum and pressure, times of vacuum and pressure, duration of steam fixation, moisture content, temperature of steam fixation and additional process data are laid down in accordance with the requirements of the BRL in the IQC of the company and appended to this form.

Procedure:
- Apply a sealant ridge to the end of the PVC-ring.
- Place the PVC-ring on the timber surface. Take care that the surface is clean, without knots, resin or other imperfections. To obtain a good fixation of the PVC-ring to the surface of the timber the ring can be turned for a moment back and forth. Give the silicon kit a moment to harden somewhat.
- Bring from the measuring cup (to be filled with about 30 ml of de-mi-water) with the squirt 20 ml de-mi-water in the PVC-ring and start the stopwatch.
- Mix, when reaching the standing time (5 minutes) the water in the PVC-ring by sucking up and squirting back the water with the pipette 3 times.
- Take a sample and carry out the determination of the copper contents. In case a determination cannot be executed immediately the sample shall be stored in a cool place in a suitable sample bottle.
- Measure the copper contents of the water sample (consult for this the operation instructions of the test kit used). Note the value and the exact standing time (stopwatch). In case the change of
colour falls outside the (upper) reach of the colour scale of the test kit the result does in any case not comply with the guide value.
- Note the end result on the ‘In-company test 2007’ form and determine whether the result complies with the guide value.
- Remove the PVC-ring from the timber at the end of the test and remove the sealant ridge (removing goes better after complete hardening).
- Rinse all material used with de-mineralized water.
APPENDIX 3b: WORK INSTRUCTION FOR THE CHIPPING TEST

Salt

Material required
- De-mineralized water
- Alcohol for rinsing
- Beaker (for the collection of the shavings)
- Brace
- Twist drill diameter 20 mm
- Glass jar of 500 ml, lockable with lid
- Alarm bell or stopwatch with alarm
- Balance with an accuracy of 0.1 g
- Paper filters (e.g. coffee filter no. 2)
- Container for filter (e.g. container for coffee filter)
- Bottles for samples PE
- Measuring cylinders 250 ml and 10 ml (for possible dilutions for the analysis)
- Analysis sets or spectrophotometer (dependent on the components to be analysed, frequency and accuracy desired. The samples can, if required, also be analysed by an independent laboratory).

Sampling
Samples shall be taken direct after the process. Included in the process is also the post-treatment, as well as a possible period of storage under a roof. Five samples shall be taken from three bundles. The sampling takes place with a sharply ground twist drill. This drill shall have a diameter of 20 mm. Use is made of a brace in order to be able to turn slowly and in such a way to be able to cut well into the timber. At each place to be samples a depth of 3 mm shall be reached. The shavings obtained shall be caught in a beaker.

The drill shall be cleaned with rinsing alcohol after sampling.

When all samples have been taken the shavings shall be mixed well.

From the mixture obtained 10.0 g shall be weighed on a balance with an accuracy of 0.1 g.

Processing of the samples
The 10 g of wood shavings are put into a jar of 500 ml. Pour 250.0 g of demineralized water in the jar and close the jar with a plastic lid. Immediately after that the jar shall be shaken by hand for a period of 120 seconds, followed by a period of 15 minutes during which the shavings shall remain in the jar. Subsequently the jar shall be shaken for another 120 seconds. Immediately after that the leached water shall be poured in a new unbleached coffee filter no. 2 and caught in a sample bottle of PE.

The analysis shall preferably take place direct, but not later than 3 weeks. Should it, for any reason, not be possible to carry out the analysis immediately, the sample bottles shall be kept cool at a temperature of 2-4 ºC until the analysis takes place.

Analysis
For the analysis of the leached water from the timber impregnated with salt a good photometric test is available for most of the components. These analyses could also be carried out in-company. Furthermore there is of course the possibility to have these samples analysed by a laboratory. For a number of components are sufficient accurate colorimetric accelerated tests available.
Requirements in respect of accuracy and the limits of detection of the method of analysis applied

<table>
<thead>
<tr>
<th>Component</th>
<th>Detection limit</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boron</td>
<td>1 mg/l</td>
<td>0.5 mg/l</td>
</tr>
<tr>
<td>Chromium</td>
<td>0.5 mg/l</td>
<td>0.2 mg/l</td>
</tr>
<tr>
<td>Copper</td>
<td>0.1 mg/l</td>
<td>0.1 mg/l</td>
</tr>
</tbody>
</table>
BIJLAGE 4a: Model KOMO® product certificate Timber preservation
Methode Vacuüm en Druk

KOMO® product certificate

Name (CI)
Address (CI)
Telephone number (CI)
Telefax number (CI)
E-mail (CI)

TIMBER PRESERVATION VACUUM AND PRESSURE METHOD

Number: Issued: Replaces:

Producer

Factory at

Importer

DECLARATION BY (CI)

This product certificate has been issued on the basis of BRL 0601 “Timber preservation”, in accordance with the (CI) Regulations for Certification issued.

(CI) declares that:

- there is a legitimate confidence that the timber treated by the producer continuously complies with the technical specifications laid down in this product certificate, provided that the timber has been marked with the KOMO® mark depicted hereunder.

For (CI) (name of director), director

The product certificate has been included in the "Overview of quality declarations in the building industry" as published on the website of the KOMO foundation: www.komo.nl.

Users of this product certificate are advised to enquire at (CI) whether this product certificate is still valid: (website CI).

This product certificate consists of …. pages.

The following has been assessed:
- quality system
- product
- Periodic control
1. TECHNICAL SPECIFICATIONS

1.1 Subject

The treatment of timber for use in the following areas of application. The applications are based on use classes according to NEN-EN 335-1.

<table>
<thead>
<tr>
<th>Use class</th>
<th>Application Area</th>
<th>Colour Code</th>
<th>Letter Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Above ground, not exposed to the elements</td>
<td>Black</td>
<td>L</td>
</tr>
<tr>
<td>2</td>
<td>Above ground, with risk of wetting</td>
<td>Orange</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Above ground and periodically in contact with rain water</td>
<td>Blue</td>
<td></td>
</tr>
<tr>
<td>4a</td>
<td>Contact with ground and ground water</td>
<td>White</td>
<td>G</td>
</tr>
<tr>
<td>4b</td>
<td>Permanently in ground (water) contact or fresh water contact</td>
<td>Green</td>
<td>W</td>
</tr>
<tr>
<td>5</td>
<td>Permanently in contact with brackish or salt water</td>
<td>Red</td>
<td>Z</td>
</tr>
</tbody>
</table>

1.2 Environment Paragraph

Timber treated under this product certificate complies with the leaching standards as laid down in the Assessment Directive 0601 “Timber preservation”. The leaching standards refer to the storage period between the treating process and supply of the treated timber.

1.3 Wood preservative(s)

Use is made of timber preservatives that, according to the BPR, are allowed under the circumstances in which the timber shall be used, described by the designer and/or buyer.

1.4 Timber

The timber quality can be shown by means of a KOMO® product certificate. The timber quality is however not assessed, in the context of this product certificate.

1.5 Markings

The treated timber supplied with the KOMO product certificate shall be marked per bundle or per packaging unit with:

1. The application of the KOMO®-mark or logo.

2. The application of the certificate number and/or name of the manufacturer of the treated timber.

3. The application of a unique production/charge number. When separating the bundle this sequence number need not be present on each unit. From each charge it shall be administered what the sequence numbers are and by which process parameters the timber has been treated;

4. A statement for which application the treated timber is suitable by means of at least the use class indication according to NEN-EN 335-1, or a colour or letter code as mentioned in the table above.

5. A statement of the trade name or the approval number of the preservative by which the timber has been treated.

Location of the mark: clearly and indelible on each bundle or packaging unit.
1.6 Written instructions for the buyer

For each delivery of a consignment of treated timber the producer shall supply instructions for the purchaser/user/consumer with the following content:

- This product has been treated with the preservative legally approved in the Netherlands according to the method (trade name of the preservative + Number of approval)

Certificate holders in foreign countries shall formulate this as follows:
This product has been treated with the preservative according to the method and agrees with that being legally allowed in the Netherlands according to Ordinance of Approval SDTP (no. SDTP , date)

- Legal instructions for use and limitations for the timber treated with this preservative (when applicable).

- When processing this product the normal safety instructions shall be taken in consideration such as in case of untreated timber.

- Processing to the timber shall all be completed before treatment is started. If it is unavoidable that processing will be done after treatment of the timber, the processed parts shall receive an after treatment with a preservative permitted for the application.

- Timber leftovers and sawdust shall be disposed of as domestic waste (private) or industrial waste (professional). It is not allowed to burn these in an open fire place, wood-burning stove or open fire.

- At the end of the period of use, treated timber shall be disposed of in accordance with the relevant legal instructions.

2 PROCESSING

Processing of treated timber shall take place in accordance with the processing instructions laid down Point 1.6 of this product certificate.

3 PERFORMANCES

3.1 Leaching

The leaching of treated timber, determined by means of the in-company test 2007 or the shower test, is less than the maximum values allowed as mentioned in the following sub-sections.

3.1.1 For non-chromium containing preservatives by means of the in-company test 2007:

for copper: - 1,6 mg/l Cu and at least 48 h of storage;
- 0,8 mg/l Cu and at least 24 h of storage.

3.1.2 For chromium containing preservatives by means of the shower test:

for copper - maximum leaching of 300 mg/m3;
for chromium - maximum leaching of 600 mg/m3;
for boron - maximum leaching of 2000 mg/m3.

3.1.3 For non-chromium containing preservatives by means of the shower test:

for copper - maximum leaching of 700 mg/m3;
for PAK - maximum leaching of 2500 mg/m3.
4 SUGGESTIONS FOR THE USER

4.1 On delivery of treated timber inspect whether:

- the products comply with the contract of sale;
- the mark and manner of marking are correct;
- the products do not show any visible defects due to transport or similar causes.

If the products are rejected on the basis of the above, the user should contact:

«Company Name»

and when required:

the certifying body SKH
'Het Cambium' Building,
Nieuwe Kanaal 9c, 6709 PA Wageningen
PO Box 159, 6700 AD Wageningen
The Netherlands
Phone: +31(0)317 45 34 25  E-mail: mail@skh.org
Fax: +31(0)317 41 26 10 Website: http://www.skh.org

4.2 Product Certificate

It is the duty of the producer to make sure that the buyer receives a copy of the complete product certificate, as well as the accompanying instruction in writing. See also section 1.6 of this product certificate.

4.3 Application and use

The buyer/user/consumer shall observe the processing instructions laid down in the written instruction referred to above.

4.4 Control of Validity

Consult the SKH/website https://www.skh.org to verify whether the product certificate is still valid.
APPENDIX 4b: Sample KOMO® Product Certificate Timber Preservation
Immersion Method

KOMO® product certificate

Name (CI)  
Address (CI)  
Phone number (CI)  
Fax number (CI)  
E-mail (CI)  

TIMBER PRESERVATION IMMERSION METHOD

Number:  
Issued:  
Replaces:  

Producer  
Factory at  
Importer  

DECLARATION BY (CI)

This product certificate has been issued on the basis of BRL 0601 “Timber preservation”, in accordance with the (CI) Regulations for Certification issued.

(CI) declares that:

- there is a legitimate confidence that the timber treated by the producer continuously complies with the technical specifications laid down in this product certificate, provided that the timber has been marked with the KOMO® mark depicted hereunder.

For (CI) (name of director), director

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